

## CLIMATOLOGICAL DATA FOR JULY, 1912.

## DISTRICT No. 5, UPPER MISSISSIPPI VALLEY.

GEORGE M. CHAPPEL, District Editor.

## GENERAL SUMMARY.

The chief feature of climatological interest in July, 1912, over the upper Mississippi Valley was the abnormally heavy rainfall at many points. The precipitation in the upper Wisconsin Valley was especially heavy and resulted in a disastrous flood in that section, an account of which follows in a separate article. Thunderstorms were more numerous than usual and in many cases were of a damaging character. Descriptions of some of these appear under other headings. In North Dakota the month was notable for many hailstorms, and considerable damage to crops and buildings was caused therefrom. In the same State there was the rather unusual phenomenon of a heavy frost on the 15th, resulting in damage to crops and gardens, but the damage was greatest in that part of the State lying in the Missouri watershed. Frost was reported also from points in Minnesota and Wisconsin on the 15th, 16th, and 19th.

Over most of the district the month was seasonable so far as temperature conditions are concerned; the average departure of the mean temperature from the normal being negligible. Owing to the absence of lengthy periods of high temperature the month, in popular opinion, was regarded as a cool one, even in those districts where there was a slight excess of temperature.

The following table presents in condensed form the leading features of climatological interest for the various parts of the district:

Parts of States within District 5.	Temperature.				Precipitation.					
	Mean.	Departure.	Highest.	Lowest.	Average.	Departure.	Greatest total.	Least total.	Average snowfall.	Average number of days with precipitation.
North Dakota.....	65.6	-0.7	100	30	3.96	+0.98	8.87	1.95	.....	12
Minnesota.....	68.7	-0.5	98	31	4.48	+1.34	8.85	1.50	.....	11
South Dakota.....	68.8	-0.2	90	41	6.80	+2.94	8.02	5.58	.....	11
Wisconsin.....	69.3	-0.3	100	28	6.12	+2.98	15.26	1.40	.....	10
Iowa.....	74.3	+0.8	102	42	4.03	+0.15	7.56	1.61	.....	10
Missouri.....	78.0	+1.2	104	53	3.02	-1.78	4.11	0.18	.....	6
Indiana.....	71.7	-1.9	93	47	6.19	+1.42	8.30	3.42	.....	11
Illinois.....	75.5	+0.3	100	43	3.92	+0.17	8.84	0.69	.....	8

## TEMPERATURE

An inspection of Table No. 1, which gives the departure of the mean temperature from the normal, for those stations having a record covering 10 years or more, will show how general was the prevalence of seasonable temperature conditions over the district. The small departures everywhere are striking. The average temperature for all stations was  $71.5^{\circ}$ , which may be regarded as the normal temperature of this district for July.

The month was very slightly cooler than usual in northern sections and correspondingly warmer than usual in southern sections. The highest monthly mean temperature was  $80.1^{\circ}$ , at Steffenville, Mo., which station also reported the highest temperature for the month,  $104^{\circ}$ . Thirteen other stations in the district reported a temperature of  $100^{\circ}$  or higher sometime within the month. The lowest monthly mean was  $61.8^{\circ}$ , at Donnybrook, N. Dak.

A notable feature of the temperature conditions of the month was the absence of any very extended period of hot weather. While the usual number of hot days occurred, especially in southern sections, they did not occur consecutively, but were scattered over the month. As it was, however, the first half of the month was warmer than the latter half. The third week was cool throughout, with frost reported from the northern States on two or three dates. At Bottineau, N. Dak., the temperature on the 15th fell to  $30^{\circ}$ , the lowest reported for the month.

## PRECIPITATION.

The month was notably wet at many points in the district, at some stations being the wettest July on record. One station each in the North Dakota, Minnesota, South Dakota, and Indiana areas, 4 in the Illinois, and 12 in the Wisconsin reported more than 8 inches of rainfall for the month. Three stations in the Wisconsin area had more than 10 inches, the extraordinary amount of 15.26 inches being measured at Merrill, Wis. Eleven and twenty-five hundredths inches of this fell on the 23d and 24th.

The average precipitation for the 333 stations in the district that reported was 4.46 inches, or 0.79 inch greater than the normal. In Wisconsin, the wettest section, the fall averaged more than 6 inches. Only 4 stations in the district reported less than an inch, the least being 0.18 inch, at Vandalia, Mo.

Usually the geographical distribution of precipitation in July in this district is quite irregular and that for the current month was no exception to the rule. One of the most striking illustrations of this irregularity is shown by comparing the monthly amounts at Edwardsburg and Coatsburg stations in Illinois about 105 miles apart. At Edwardsburg 8.84 inches occurred, while at Coatsburg the fall was but 0.83 inch.

Except over an area in west-central Illinois and in the Missouri area, where comparatively little precipitation occurred during the latter half of the month and where drouthy conditions prevailed at the close, the precipitation of the month was well distributed in point of time. Even in some of the individual States rainfall occurred somewhere daily.

Fifty-three stations reported 2.5 inches or more rainfall in a 24-hour period. Moreover, excessively heavy precipitation for short intervals of time occurred somewhere in the district on one-half the days of the month. The average number of rainy days for all the stations was 10.

## RIVERS.

The principal event of the month was the flood on the Wisconsin River, which was caused by torrential rainfalls over the upper watershed on the 23d and 24th. The losses aggregated more than half a million dollars. A full report on this flood appears elsewhere in a separate article.

The stage of water in the upper Mississippi River was amply sufficient for navigation all the month.

## MISCELLANEOUS.

Winds from a southerly direction predominated, the prevailing direction being south at 90 stations, southwest at 75, and southeast at 52. The highest velocity reported was 80 miles an hour, from the northwest at Minneapolis, Minn., on the 12th in connection with the severe thunderstorm there on that date. For one minute the wind blew at the rate of 90 miles an hour.

The percentage of sunshine for the district as a whole was about 70, which is close to the normal. There was a slight deficiency in the north and a corresponding excess in the south. The average number of clear days was 15; partly cloudy, 11; cloudy, 5.

## LOCAL STORMS IN JULY, 1912.

By U. G. PURSELL, Section Director, Minneapolis, Minn.

Severe local storms occurred at Campbell on the 8th, buildings being blown down; at Fergus Falls on the 8th-9th much damage was done to trees and buildings; at Grand Meadow a tornado overturned many windmills and did much damage to trees, crops, and barns.

By CLARENCE J. ROOT, Section Director, Springfield, Ill.

Some unusually heavy rainfalls were reported from various sections of the State. The principal of these was at Alton on the night of the 13th-14th. No station is maintained at Alton, but our observer at Edwardsville, 13 miles distant, Mr. W. H. Morgan, says "The storm of the 13th-14th began as a light rain at 11 p. m. of the 13th, increasing until 12.30 a. m. of the 14th, from which time it rained until 3 a. m. with terrific violence. (Total, 6 inches.)" District Forecaster Montrose W. Hayes, of the St. Louis station, visited Alton in person and made a full and complete report of the storm, which appears elsewhere. A heavy rain at Lake Como in the northern part of the State on the 13th washed out the tracks of the Chicago & Northwestern Railway. The observer at Mascoutah says, "On the 6th, 4 miles south of here in Englemen Township, there was a heavy rain (3.6 inches), attended by thunder and lightning, while only 0.2 inch fell here and 4 miles north it did not lay the dust." The heaviest downpour in the history of the station occurred at Springfield on the 6th. Two and seventy-four one-hundredths inches of rain fell in one hour, and 1 inch in a fraction over 11 minutes. The greatest previous record for 1 hour was 1.57 inches, June 7, 1896. Cellars and basements were flooded. Damage by washing occurred in the parks and the street-car subways were impassable. Heavy rains occurred on the 20th and 21st in the northern part of the State. At Freeport the Pecatonica River caused considerable damage from high water. Crops, while injured in places were greatly benefited by the rain. In Fulton County the Spoon River overflowed portions of the bottom, destroying much corn and oats. A heavy rain of 2.67 inches fell at Peoria. Thousands of dollars damage was done in Peoria and the surrounding country.

Peoria is rather hilly and the water running through the ravines caused considerable washing. The storm was at its worst in the upper end of the city, where many basements were flooded and some walls injured. In the country some bridges were carried away and crops suffered heavily. At Antioch, on the 13th, 5.1 inches of rain fell in five hours.

As a result of the numerous thunderstorms, much damage was caused by lightning and wind. The following notes contain the information available at this office:

Mr. R. T. Lindley, local forecaster, Cairo, Ill., reports as follows regarding a storm at Cairo on July 5, 1912: "A local storm, described in the press as a tornado, but which appears not to have had the funnel-shaped cloud characteristic of the tornado, crossed this city between 4 and 5 p. m. The undersigned was absent from the city at the time of occurrence, but from the description of accurate observers the storm was probably a squall, attending the passage of a severe thunderstorm. Lightning struck the building in which our office is located within a few feet of the instrument shelter, the damage being slight. The extreme velocity of the wind was 75 miles an hour, at 4.28 p. m. Considerable damage was done, one building being blown down and an occupant thereof sustaining severe injuries. Some of the streets were well-nigh impassable on account of uprooted trees, and telephone wires were broken in many places. The roof of a small restaurant building was blown for a block and some loose portions of the roof struck a passing street car laden with passengers, breaking several windows of the car, but injuring no one seriously."

During the severe thunderstorm in Springfield on the 6th, six men were rendered unconscious when lightning struck a tree near the tent of Maj. Davis at Camp Lincoln. All recovered. Telephone and electric light lines suffered severely and street-car service was demoralized. On the 28th another thunderstorm resulted in a fire in a furniture store in which stock and property to the amount of \$45,000 was destroyed. Some street cars were reported to have been damaged also. A 10-year old boy, Ezra Haines of Mason City, was struck and instantly killed by lightning about 3 o'clock in the afternoon of the 9th. During the electric storm of the 29th at Pecatonica lightning struck a barn on a near-by farm, destroying the structure together with the hay and machinery stored therein. At Rockton lightning struck a greenhouse, destroying two buildings and their contents. A severe electric and wind storm swept over Shelbyville between 8 and 9 o'clock on the night of the 13th. In this storm there is indisputable evidence of tornadic action. Observers report a funnel-shaped cloud, which left a path of destruction 1,500 feet wide. A house was struck by lightning and burned and a church was badly damaged as were several residences. No lives were lost. S. P. Peterson, observer La Salle, Ill., reports as follows: "A severe thunderstorm occurred on the 1st. A large barn in this city was struck by lightning and destroyed. The loss is estimated at \$3,000." Unusually large hail fell at Bloomington on the 28th, some stones measuring 1½ inches in diameter. There was no great damage. Forest City was visited by a severe storm on the afternoon of the 28th. Considerable damage was done to property.

By V. H. CHURCH, Section Director, Indianapolis, Ind.

Thunderstorms were very frequent and were accompanied in some instances by excessively heavy local showers. A fall of 3.19 inches was recorded at Plymouth



















TABLE 3.—*Maximum and minimum temperatures for July, 1912. District No. 5—Continued.*

Date.	Missouri.		Indiana.		Illinois.															
	Hannibal.		La Porte.		Cairo.		St. Peter.		La Salle.		Monmouth.		Mt. Vernon.		Peoria.		Springfield.		Winnebago.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1.....	85	67	84	52	78	67	84	64	85	61	87	65	85	67	85	66	86	67	79	60
2.....	84	67	84	64	78	67	79	64	82	61	82	65	80	67	83	65	83	66	84	60
3.....	80	67	88	67	87	70	82	67	83	71	82	68	87	69	82	68	80	70	88	55
4.....	91	69	88	63	91	71	90	67	92	68	93	67	91	67	93	65	93	68	92	60
5.....	92	69	92	63	91	68	91	72	96	72	95	68	90	70	94	71	95	73	98	.....
6.....	90	68	91	71	81	70	87	74	91	73	94	67	85	70	92	70	90	69	94	70
7.....	89	66	86	68	81	72	83	70	86	70	90	67	86	70	88	67	87	68	89	65
8.....	91	71	83	65	88	72	90	69	93	70	93	68	92	71	92	69	92	72	95	67
9.....	93	75	88	68	88	72	90	69	94	73	95	72	90	68	96	72	92	73	98	71
10.....	87	70	87	66	87	71	85	67	85	68	84	66	83	76	81	66	86	67	86	65
11.....	87	68	83	65	87	68	89	67	86	64	84	59	89	66	85	63	85	68	86	59
12.....	84	69	84	61	88	72	85	68	83	63	81	64	88	67	82	63	80	68	87	58
13.....	91	76	85	66	92	76	95	72	87	70	86	72	91	75	87	70	93	73	89	69
14.....	95	73	82	65	93	75	95	78	94	65	94	63	94	71	93	64	95	75	94	60
15.....	80	70	80	61	93	77	92	73	83	55	83	63	95	73	81	62	85	65	95	60
16.....	78	61	78	52	88	74	85	59	79	53	84	55	88	63	78	54	79	59	77	45
17.....	87	64	78	69	88	75	91	67	87	55	86	57	90	65	86	59	88	67	90	50
18.....	81	64	76	54	87	74	87	68	81	57	82	62	86	68	82	60	83	65	80	60
19.....	79	60	77	47	81	69	80	58	72	51	77	51	81	63	75	54	77	57	71	48
20.....	91	66	82	47	86	68	88	60	90	56	91	62	88	62	91	62	91	61	80	53
21.....	80	69	71	49	91	71	88	76	74	66	82	67	80	69	78	64	84	68	71	61
22.....	87	65	81	53	89	72	86	66	83	60	84	57	86	70	83	59	87	62	83	54
23.....	96	75	78	61	93	77	93	70	93	66	94	68	93	69	93	68	96	70	92	62
24.....	96	78	89	71	93	78	94	75	93	73	89	66	94	71	90	74	97	77	90	75
25.....	90	73	78	67	88	75	91	72	86	66	86	64	86	72	86	65	91	71	84	62
26.....	86	65	72	59	83	71	88	71	81	60	84	59	81	68	82	60	84	63	80	56
27.....	84	61	78	55	84	66	81	59	84	56	85	60	82	61	84	57	85	60	83	53
28.....	96	73	84	60	90	68	88	64	87	66	94	68	90	62	91	66	90	68	88	63
29.....	84	64	75	60	90	75	85	63	85	62	85	61	84	68	84	61	84	66	81	60
30.....	92	63	81	58	87	69	82	61	84	60	88	58	82	62	87	58	86	64	80	55
31.....	84	59	68	53	83	71	83	60	72	56	83	60	82	62	78	57	82	62	74	52
Mns.....	87.4	67.9	81.5	60.3	87.2	71.6	87.3	67.4	85.5	63.4	87.0	63.5	87.1	67.8	85.9	63.8	87.3	67.2	85.4	59.6*

\*, b, c, etc., indicate respectively 1, 2, 3, etc., days missing from the record.

§ Data are from standard instruments not supplied by the U. S. Weather Bureau.

§§ Instruments are read in the morning; the maximum temperature then read is charged to the preceding day, on which it almost always occurs.